

Hybrid LIBS and Raman Spectroscopy Standoff Detection System, Phase II

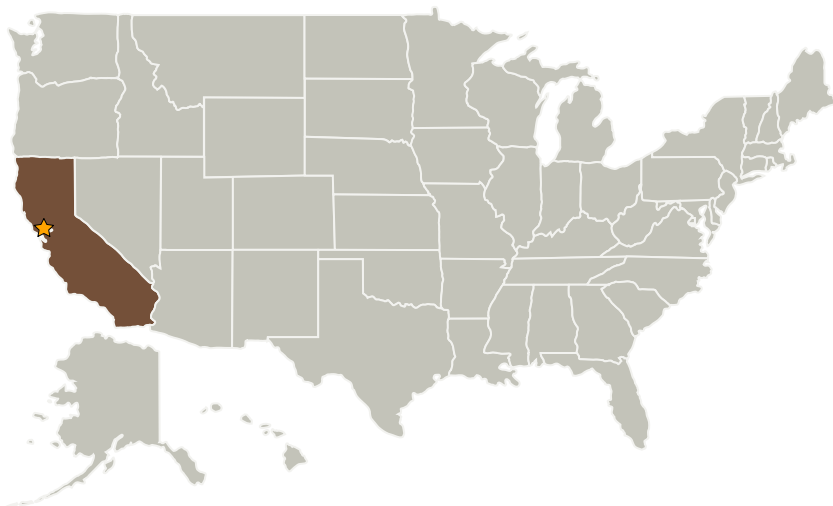
Completed Technology Project (2006 - 2008)



Project Introduction

To address NASA's need for an instrument for robotic in situ geochemical exploration of the solar system, Physical Optics Corporation (POC) proposes to develop a new hybrid Laser Induced Breakdown Spectroscopy (LIBS) and Raman Spectroscopy (LIBRA) standoff chemical analysis system. This 0.03 m³, <10 kg, <15 W passively cooled system will offer high specificity in trace chemical detection through LIBS/Raman sensor fusion to minimize false alarm rate (<1 in one million). Its hermetically sealed, monolithic, space-qualified design will ensure the survivability of LIBRA through launch and extended operation on planet surfaces. In Phase I, POC demonstrated the feasibility of LIBRA by assembling and testing a proof-of-concept tabletop (0.020 m³ sensing head; 0.025 m³ power supply) prototype with a technology readiness level (TRL) of ~4, capable of up to 5 m standoff detection and identification of inorganic, organic, and mineral samples, including compounds associated with the origins of life, of interest to NASA solar system exploration missions. In Phase II, POC will optimize the system design and develop and fabricate a fully functional LIBRA prototype system to meet the needs of NASA solar system exploration programs. Prototype test data will lead to an engineering design for a space-rover-operable prototype.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Physical Optics Corporation	Supporting Organization	Industry	Torrance, California

Primary U.S. Work Locations

California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.3 In-Situ Instruments and Sensors
 - └ TX08.3.3 Sample Handling